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3 COMBINED CARGO LAMP AND CENTER HIGH MOUNTED

4 STOP LAMP ASSEMBLY FOR VEHICLES

5
6 BACKGROUND OF THE INVENTION

7 1. Field of the Invention

8 The invention relates to lamp units for vehicles and is
9 directed more particularly to a cargo lamp assembly featuring a
10 light emitting diode, and to a combination of such an assembly
11 with a center high mounted stop lamp assembly.

12 2. Description of the Prior Art

13 Combined cargo lamp and center high mounted stop lamp
14 assemblies are generally known. In U.S. Patent No. 4,891,625,
15 issued January 2, 1990 to Bradley C. Van Riper et al, there is
16 shown and discussed a combined center high mounted stop lamp and
17 cargo lamp assembly for pick-up trucks, vans, and the like. The
18 assembly includes a housing for three side-by-side lamps. Each
19 lamp features an incandescent bulb and a parabolic reflector, and
20 an appropriate lens, red for the stop lamp lens and clear for the
21 cargo lamp lenses.

22 Another combined cargo lamp and stop lamp is shown and
23 described in U.S. Patent No. 6,086,230, issued July 11, 2000 to
24 George Wooldridge et al. In this instance, the combination is
25 adapted for disposition on a rear cargo door of a panel truck,
26 sport utility vehicle, or the like, wherein a rear cargo door is
27 pivotally mounted on a side edge thereof. The combination
28 features two lamps, a stop lamp for exhibiting a stop-signal, and

1 a cargo lamp for lighting the interior of the vehicle. The
2 assembly features various types of incandescent light bulbs, such
3 as snap-in, plug in and/or hard wired.

4 The use of incandescent bulbs presents a number of problems.
5 Their size requires an appropriately sized housing. Their life
6 duration requires periodic replacement and can lead to loss of
7 use at inopportune times. Replacement requires service access
8 facility. In some instances, the temperature of functioning
9 incandescent bulbs, particularly in large numbers, can result in
10 problems relative to temperature-sensitive cargo.

11 Thus, there is a need for a cargo lamp assembly for
12 vehicles, which assembly is devoid of incandescent bulbs and,
13 rather, relies upon light emitting diodes (LED) for optical
14 enhancement of a cargo area.

15 There is further a need for such a cargo lamp assembly in
16 combination with a center high mounted stop lamp assembly, the
17 latter being of either a traditional structure or of an LED based
18 structure.

19 20 SUMMARY OF THE INVENTION

21 Accordingly, an object of the invention is to provide a
22 cargo lamp assembly for vehicles, the lamp including a white
23 light emitting diode and a lens for appropriately configuring the
24 beam of light emitted by the diode.

25 A further object of the invention is to provide a combined
26 cargo lamp assembly, as set forth immediately above, and stop
27 light assembly for vehicles.

1 With the above and other objects in view, a feature of the
2 invention is the provision of a cargo lamp assembly for vehicles.
3 The assembly comprises a white light emitting diode having an
4 aperture for emitting a light beam in an arc of 120° in a
5 horizontal plane, and 120° in a vertical plane, and a lens for
6 receiving the beam and reducing the beam to about 60° in the
7 horizontal plane and in the vertical plane.

8 In accordance with a further feature of the invention, there
9 is provided a cargo lamp assembly for vehicles. The assembly
10 comprises a white light emitting diode (LED) having an aperture
11 for emitting a light beam in an arc of x° to the left and x° to
12 the right of a central axis of the beam in a horizontal plane,
13 and a lens for reducing the beam to an arc of about $1/2x^\circ$ to the
14 left and about $1/2x^\circ$ to the right of the central axis, the lens
15 being configured in horizontal cross section to provide a lens
16 focal point about twice the distance from the lens as the
17 distance of the LED from the lens.

18 In accordance with a further feature of the invention, there
19 is provided a cargo lamp assembly for vehicles. The assembly
20 comprises a white LED having an aperture for emitting a light
21 beam in an arc of y° above and y° below a central axis of the
22 beam in a vertical plane, and a lens for reducing the beam to an
23 arc including in the vertical plane an upper boundary deflected
24 downwardly about 10° relative to a horizontal plane, and a lower
25 boundary of about $1/2y^\circ + 10^\circ$, the lens being configured in
26 vertical cross section to provide a lens focal point coincident
27 with the distance from the lens to the LED.

1 In accordance with a still further feature of the invention,
2 there is provided a combined assembly of a center high mounted
3 stop lamp (CHMSL) assembly and a cargo lamp assembly for a
4 vehicle. The combined assembly comprises a housing for mounting
5 on a rearwardly facing wall surface of a body portion of the
6 vehicle proximate a top thereof and proximate a transverse center
7 of the vehicle, the housing having compartments including at
8 least one compartment for housing a CHMSL component and having a
9 stop lens. The housing further includes left and right
10 compartments, respectively on opposite sides of the CHMSL
11 compartment, each having a cargo light lens and a white LED for
12 directing a beam of light to the respective cargo light lens.
13 Each of the cargo lamp assemblies comprises one of the cargo
14 lenses and one of the LEDs, the LEDs each having an aperture for
15 emitting the light beam in an arc of about 120° in horizontal and
16 vertical planes, and each of the cargo lenses being adapted to
17 reduce the light beam in a horizontal plane to about 60° and
18 reducing the light beam in a vertical plane to about 60°.

19 The above and other features of the invention, including
20 various novel details of construction and combinations of parts,
21 will now be more particularly described with reference to the
22 accompanying drawings and pointed out in the claims. It will be
23 understood that the particular device embodying the invention is
24 shown by way of illustration only and not as a limitation of the
25 invention. The principles and features of this invention may be
26 employed in various and numerous embodiments without departing
27 from the scope of the invention.

1 BRIEF DESCRIPTION OF THE DRAWINGS

2 Reference is made to the accompanying drawings in which is
3 shown an illustrative embodiment of the invention, from which its
4 novel features and advantages will be apparent.

5 In the drawings:

6 FIG. 1 is a perspective view of one form of combined center
7 high mounted stop lamp assemblies and cargo lamp assemblies
8 illustrative of an embodiment of the invention;

9 FIG. 2 is a rear elevational view of the combined assemblies
10 of FIG. 1;

11 FIG. 3 is a diagrammatic view of a cargo lamp assembly,
12 including a sectional view of a lens portion of the assembly
13 taken along line III-III of FIG. 2; and illustrative of an
14 embodiment of the invention; and

15 FIG. 4 is a diagrammatic view of the cargo lamp assembly of
16 FIG. 3, including a sectional view of the lens portion of the
17 assembly taken along line IV-IV of FIG. 2.

18
19 DESCRIPTION OF THE PREFERRED EMBODIMENTS

20 Referring to FIGS. 1 and 2, it will be seen that an
21 illustrative embodiment of the invention includes a housing 10
22 for one or more center high mounted stop lamp (CHMSL) assemblies
23 12 and one or more cargo lamp assemblies 14. As illustrated in
24 FIGS. 1 and 2, the combined assemblies typically include a series
25 of the side-by-side stop lamp assemblies 12 and a cargo light
26 assembly 14 on opposite ends of the series of stop lamp
27 assemblies.

1 The housing 10 typically is mounted, as by a connector 16
2 (FIG. 1), to a rearwardly facing wall surface of a body portion
3 of a vehicle (not shown), such as a pick-up truck, or the like,
4 the housing being mounted proximate a transverse center of the
5 vehicle. The stop lamp assemblies 12 are each provided with a
6 stop lamp lens 18, usually red in color. The cargo lamp
7 assemblies 14 are each provided with a clear lens 20.

8 Referring to FIG. 3, it will be seen that each cargo lamp
9 assembly 14 includes a white LED 22 having an aperture for
10 emitting a light beam 24 in an arc a of about 120° in a
11 horizontal plane, about 60° to the right of a beam axis 26 and
12 60° to the left. The emitted beam 24 is emitted in the vertical
13 plane (FIG. 4) about 60° above the beam axis 26 and 60° below the
14 beam axis.

15 The cargo lamp assembly 14 includes the lens 20 which is
16 provided with a configuration different in horizontal section
17 (FIG. 3) than in vertical section (FIG. 4). The cargo lamp lens
18 20 reduces the arc a of the beam 24 in the horizontal plane to
19 about 60° , about 30° to the left of the beam axis 26 and 30° to
20 the right of the beam axis. A beam 28 emitted by the lens 20, in
21 the horizontal plane (FIG. 3) includes a right boundary r and a
22 left boundary l which are substantially parallel to each other.

23 The cargo lamp lens 20 reduces the arc a' of the beam 24 in
24 the vertical plane (FIG. 4) to about 60° . The beam 28 emitted by
25 the lens 20 in the vertical plane includes a top boundary t
26 deflected downwardly about 10° relative to the horizontal plane,
27 and a lower boundary b extending downwardly about 70° relative to
28 the horizontal plane.

1 In the horizontal plane, the LED 22 is disposed at a
2 distance d from the lens 20 which is about one-half a distance f
3 to a focal point F of the LED, as shown in FIG. 3. In the
4 vertical plane, the LED 22 is disposed substantially at the focal
5 point F .

6 Preferably, the LED 22 is at least an 18 lumen LED and the
7 lens 20 emits at least about 10 candela. In a combined assembly
8 with two LEDs, each LED is preferably at least an 18 lumen LED,
9 such that the two cargo light assemblies emit at least about 20
10 candela, a more than adequate lighting for pick-up truck cargo
11 areas. Alternatively, a single 40 lumen LED, scheduled for
12 production in 2004 or 2005, should prove useful.

13 If the LED 22 provides an aperture so as to emit a different
14 arc of beam, x° to the left and x° to the right of the axis 26 in
15 the horizontal plane and y° above and y° below the central axis
16 26 of the beam 24 in the vertical plane, the lens 20 reduces the
17 arc in the horizontal plane to about $1/2x^\circ$ to the left and $1/2x^\circ$
18 to the right of the axis 26, and reduces the arc in the vertical
19 plane defined by the upper boundary t deflected downwardly about
20 10° relative to the horizontal plane and the lower boundary b of
21 about $1/2y^\circ + 10^\circ$.

22 The lens 20 may be a "Fresnel" type lens, well known in the
23 art, configured to produce the above described arcs. A Fresnel
24 type lens provides the advantages of reduced material
25 requirement, ease of molding, and resulting reduced costs in
26 manufacture.

1 Further, the lenses 18, 20 may be molded in one piece. The
2 one piece lens can be all clear, inasmuch as the CHMSL LED emits
3 red light, or can be in part clear and in part red.

4 There is thus provided a cargo lamp assembly for vehicles,
5 the lamp including a white light emitting diode and a lens for
6 appropriately configuring the beam of light emitted from the
7 diode. There is further provided a combined assembly including
8 at least one cargo lamp of the type aforesaid, in combination
9 with one or more stop lamp assemblies.

10 It will be understood that many additional changes in the
11 details, materials, and arrangement of parts, which have been
12 herein described and illustrated in order to explain the nature
13 of the invention, may be made by those skilled in the art within
14 the principles and scope of the invention as expressed in the
15 appended claims.